

REMARKS/ARGUMENTS

Support for the Amendment

The above amendment is an incorporation of the limitation of claim 25 into claim 21 and the cancellation of claim 25. No new matter is presented, and the claim has already been examined in its original form of claim 25.

Claim Rejections -- 35 USC § 103

In view of the above amendment, the rejection of claims 21-23, 25-28, 30-33, and 38 over the combination of Gallagher (US 3,895,102) and Molter (US 4,818,637) is respectfully traversed. The amendment reduces the scope of claim 21, and hence all claims since all depend from claim 21, either directly or through intervening claims, by limiting the aqueous solution to a potassium hydroxide solution and removing the last remaining open-ended term "containing" from the recitation of the reaction mixture. The claims are thus limited to a process in which the only substances contacted in the reaction stage are aluminum metal and aqueous potassium hydroxide. The reaction system in Gallagher, by contrast, includes as a required component "a salt compound" together with the silicon-containing metal (which as the examiner points out is described in column 12 as being replaceable by aluminum or aluminum alloys) and the liquid hydroxide. Suitable salt compounds according to Gallagher are listed in column 3, lines 5-22, which recites "an inorganic salt compound and more particular [*sic*] an alkali metal or other water-soluble salts, and preferably a sodium salt compound, such as sodium chloride ..." There is no suggestion from Gallagher that hydrogen gas generation could be achieved in a system that lacks the salt compound.

Applicant once again submits that the temperature recitation in Applicant's claim 21 distinguishes the invention from the Gallagher disclosure. As previously noted, the maximum temperature disclosed in Gallagher is 80°C, which is equivalent to 176°F. This is below Applicant's claimed temperature of 180°, and even though Applicant's claim language recites this temperature as "*approximately* 180 degrees Fahrenheit," the Gallagher disclosure does not

suggest performing the reaction between aluminum metal and hydroxide ion at this temperature, since the Gallagher temperature range refers to a different reaction, *i.e.*, the reaction between a *silicon-containing metal* and hydroxide ion. While Gallagher mentions aluminum as a substitute for silicon, there is no suggestion in Gallagher that the aluminum would react at the same temperature as silicon. The appropriate source for reaction conditions involving aluminum is the disclosure of von Sturm *et al.* (US 3,574,560), which focuses on the use of aluminum and indicates that the temperature should be *lowered* when the reactants are placed in full contact, as explained further below.

The Molter *et al.* patent is again cited for its disclosure of humidifying hydrogen gas prior to introducing it into a hydrogen/halogen fuel cell. While the Molter *et al.* patent does include such a disclosure, it does not otherwise provide the elements lacking from the Gallagher disclosure. Molter *et al.* fail to address the reaction between aluminum metal and potassium hydroxide and thus offer no suggestion of how this reaction might be conducted. Indeed, Molter *et al.* disclose nothing at all about processes for generating hydrogen gas.

The rejection of claims 24 and 39-40 over the combination of Gallagher, Molter *et al.*, von Sturm *et al.* (US 3,574,560), and Richman (US 3,669,741) is likewise respectfully traversed. These claims all depend from claim 21, either directly or through an intervening claim, and as noted above, claim 21 is patentably distinct in view of its limitation to a reaction system that contains only aluminum metal and aqueous potassium hydroxide. As noted above, Von Sturm *et al.* is the only reference in this group that addresses a reaction system containing these two reactants, but von Sturm *et al.* fail to disclose the temperature, or the use of the temperature in a system in which the aluminum metal is fully immersed in the aqueous solution. The aluminum shown in von Sturm *et al.* is in the form of aluminum rods, and unlike Applicant's system as claimed, the liquid level used by von Sturm *et al.* is maintained below the tops of the rods. As for temperature, von Sturm *et al.* disclose *raising* the liquid level only when the temperature is *lowered*. Applying this teaching to the disclosure of Gallagher, which is unlikely since they address two different reactions, would clearly suggest to one skilled in the art that one should *lower* the operating temperature of Gallagher, or at least operate toward the

lower end of the range, if one were to fully immerse the aluminum rods of von Sturm *et al.* in the lye solution, as Applicant claims. The combined teachings of these references thus point the skilled artisan in the direction opposite to that of the present invention.

Richman is cited for its disclosure of periodically opening the tank to replace the fuel tubes. Richman however discloses a reaction system that differs fundamentally from that of Applicant by requiring the inclusion of silicon in the reaction mixture to produce the hydrogen gas. Furthermore, Richman cites a temperature significantly above that claimed by Applicant (see column 11, lines 10-12 of Richman), offering no suggestion of the lower temperature. Even if it did suggest a temperature 15 degrees lower, the suggestion would not be transferable to Applicant's reaction, since Applicant's reaction does not form potassium aluminum silicate (column 2, lines 45-50 of Richman).

The rejection of claims 34-36 over the combination of Gallagher, Molter *et al.*, and Knowlton *et al.* (US 2001/0013321 A1) is likewise respectfully traversed. Applicant recognizes that Knowlton *et al.* is cited for its disclosure of condensing water from an engine exhaust and recycling the condensed water to the hydrogen generator. The rejected claims depend from claim 21, however, either directly or through an intervening claim, and none of the three references in this group disclose the reaction system of claim 21. The hydrogen generation reaction in Knowlton *et al.* is a reaction between water and a hydrocarbon fuel. Neither potassium hydroxide nor aluminum metal are present in the system.

CONCLUSION

In view of the foregoing, reconsideration of the application is respectfully requested. Should any matters remain that can be resolved by a conference with Applicant's attorney, the examiner is invited to telephone the undersigned at 415-576-0200.

Respectfully submitted,



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